

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

1. (Currently Amended) An automatic staining apparatus comprising:
at least one removable reagent container positioned on a reagent rack within a reagent section;
at least one slide positioned within a slide section;
wherein a robotic element is configured to move above the reagent section and above the slide section during a staining process and wherein the reagent rack is removable below the plane of the robotic element;
wherein the reagent section is situated to enable the at least one removable reagent container to be added to or removed from the apparatus without interrupting the movement of the robotic element during dispensing of at least one reagent during the staining process;
wherein the robotic element comprises an optical sensor configured to automatically identify new slides and reagent bottles loaded into the apparatus during the staining process; and
a control element to which the robotic element is responsive, the control element configured to
monitor insertion or removal of the at least one removable reagent container during the staining process and to continue movement of the robotic element and dispensing of at least one reagent during insertion or removal of the at least one removable reagent container.

2. (Original) An apparatus according to claim 1, wherein the optical sensor is adapted to locate pre-selected reference features for self-calibration of the robotic element.

3. (Previously Presented) An apparatus according to claim 1, wherein a sample is placed on the at least one slide, and
wherein the optical sensor is adapted to record an image of the finalised sample after said sample has been subjected to the staining process.

4. (Previously Presented) An apparatus according to claim 3, further comprising:

at least one element provided on the at least one removable reagent container and the at least one slide;

wherein at least one element comprises an element selected from a group consisting of: a two-dimensional high-resolution symbology code, a datamatrix code, a bar code, an adhesive label, a two dimensional symbology zone, and a human readable text zone.

5. (Previously Presented) An apparatus according to claim 3, wherein the optical sensor is configured to identify a feature selected from a group consisting of: the texture of the sample, the outline of the sample, a visual property of the sample, and an individual identification feature of the sample.

6. (Currently Amended) A method of identifying at least one property in an automatic staining apparatus comprising the steps of:

providing at least one sample on a slide positioned within a slide section;

providing at least one reagent container positioned on a reagent rack within a reagent section;

wherein a robotic element is configured to move above the slide section and above the reagent section during a staining process and wherein the reagent rack is removable below the plane of the robotic element;

wherein the at least one reagent container is added to or removed from the apparatus without interrupting dispensing of at least one reagent during the staining process;

providing the robotic element with an optical sensor configured to automatically identify new slides and reagent bottles loaded into the apparatus during the staining process;

recording relevant image data;

recording calibration reference points of the apparatus; and

feeding said image data to a control element to which said robotic element is responsive, the control element configured to monitor insertion or removal of the at least one reagent container during the staining process and to continue movement of the robotic element and dispensing of at least one reagent during insertion or removal of the at least one removable reagent container.

7. (Currently Amended) A method of staining samples in an automatic staining apparatus comprising the steps of:
- providing at least one sample on a slide, the slide being positioned in a slide section within slide racks;
 - providing at least one reagent container positioned on a reagent rack within a reagent section;
 - wherein a robotic element is configured to move above the slide section and above the reagent section during a staining process and wherein the reagent rack is removable below the plane of the robotic element;
 - wherein the at least one reagent container is added to or removed from the apparatus without interrupting dispensing of at least one reagent during the staining process;
 - providing the robotic element with an optical sensor configured to automatically identify new slides and reagent bottles loaded into the apparatus during the staining process;
 - recording relevant image data;
 - recording calibration reference positions for said slide racks; and
 - feeding said image data to a control element to which said robotic element is responsive, the control element configured to monitor insertion or removal of the at least one reagent container during the staining process and to continue movement of the robotic element and dispensing of at least one reagent during insertion or removal of the at least one removable reagent container.

8. (Currently Amended) An automatic staining apparatus comprising:
- at least one reagent container positioned on a reagent rack within a reagent section;
 - at least one sample on a slide, the slide being positioned within a slide section;
 - wherein a robotic element is configured to move above the reagent section and above the slide section during a staining process and wherein the reagent rack is removable below the plane of the robotic element;
 - wherein the reagent section is situated to enable the at least one reagent container to be added to or removed from the apparatus without interrupting the movement of the robotic element during dispensing of at least one reagent during the staining process;
 - wherein the robotic element comprises an optical sensor configured to automatically identify new slides and reagent bottles loaded into the apparatus during the staining process and locate pre-selected reference features for self-calibration of the robotic element; and
 - a control element to which the robotic element is responsive, the control element configured to monitor insertion or removal of the at least one reagent container during the staining process and to continue movement of the robotic element and dispensing of at least one reagent during insertion or removal of the at least one removable reagent container.
9. (Currently Amended) An automatic staining apparatus comprising:
- at least one reagent container on a reagent rack in a reagent section;

at least one first sample contained on a slide in a first slide section;

at least one second sample contained on a slide in a second slide section,
wherein said first slide section and said second slide section are separated by said
reagent section;

wherein a robotic element is configured to move above the reagent section and
above the first and second slide sections during a staining process and wherein the
reagent rack is removable below the plane of the robotic element;

wherein the reagent section is situated to enable the at least one reagent
container to be added to or removed from the apparatus without interrupting the
movement of the robotic element during dispensing of at least one reagent during the
staining process; and

a control element to which said robotic element is responsive, the control
element configured to monitor insertion or removal of the at least one reagent container
during the staining process and to continue movement of the robotic element and
dispensing of at least one reagent during insertion or removal of the at least one
removable reagent container.

10. (Currently Amended) An automatic staining apparatus comprising:
- at least one reagent container positioned on a reagent rack within a reagent
section;
- at least one sample placed on a slide, the slide being positioned within a slide
section;

wherein a robotic element is configured to move above the reagent section and above the slide section during a staining process and wherein the reagent rack is removable below the plane of the robotic element;

wherein the reagent section is situated to enable the at least one reagent container to be added to or removed from the apparatus without interrupting the movement of the robotic element during dispensing of at least one reagent during the staining process;

wherein the robotic element comprises an optical sensor configured to automatically identify new slides and reagent bottles loaded into the apparatus during the staining process and image at least one optical identification element; and

a control element to which the robotic element is responsive, the control element configured to monitor insertion or removal of the at least one reagent container during the staining process using the optical identification element and to continue movement of the robotic element and dispensing of at least one reagent during insertion or removal of the at least one removable reagent container.

11. (Previously Presented) An apparatus according to claim 10 wherein the optical identification element has reiterated information, said reiterated information comprises multiple reiterated information.

12. (Previously Presented) An apparatus according to claim 11 wherein said reiterated information comprises redundant information.

13. (Cancelled)
14. (Original) An apparatus according to claim 11 wherein said optical identification element comprises a two-dimensional high-resolution symbology code.
15. (Original) An apparatus according to claim 11 wherein said optical identification element comprises a datamatrix code.
16. (Original) An apparatus according to claim 11 wherein said optical identification element comprises a bar code.
17. (Currently Amended) An automatic staining apparatus comprising:
at least one reagent container positioned on a reagent rack within a reagent section;
at least one sample on a slide, the slide being positioned within a slide section;
wherein a robotic element is configured to move above the reagent section and above the slide section during a staining process and wherein the reagent rack is removable below the plane of the robotic element;
wherein the reagent section is situated to enable the at least one reagent container to be added to or removed from the apparatus without interrupting the movement of the robotic element during dispensing of at least one reagent during the staining process;

wherein the robotic element comprises an optical sensor configured to automatically identify new slides and reagent bottles loaded into the apparatus during the staining process;

a computer image biological analysis element; and

a control element to which the robotic element is responsive, the control element configured to monitor insertion or removal of the at least one reagent container during the staining process,

wherein the optical sensor records a first image of the at least one sample before staining and records a second image of the sample after staining and to continue movement of the robotic element and dispensing of at least one reagent during insertion or removal of the at least one removable reagent container.

18. (Original) An apparatus according to claim 17 wherein said optical sensor comprises a camera.

19. (Original) An apparatus according to claim 18, wherein said camera comprises a CCD element.

20. (Cancelled)

21. (Currently Amended) A method of identifying at least one property in an automatic staining apparatus comprising the steps of:

providing at least one sample, the sample being placed on a slide in a removable slide rack, the slide rack being positioned within a slide section;

providing at least one reagent container positioned on a reagent rack within a reagent section;

wherein a robotic element is configured to move above the reagent section and above the slide section during a staining process and wherein the reagent rack is removable below the plane of the robotic element;

wherein the at least one reagent container is added to or removed from the apparatus without interrupting dispensing of at least one reagent during the staining process;

providing the robotic element with an optical sensor configured to automatically identify new slides and reagent bottles loaded into the apparatus during the staining process;

recording relevant image data;

feeding said image data to a control element to which said robotic element is responsive, the control element configured to monitor insertion or removal of the at least one reagent container during the staining process and to continue movement of the robotic element and dispensing of at least one reagent during insertion or removal of the at least one removable reagent container; and

biologically analysing image data of said at least one sample with a computer.

22. (Previously Presented) A method according to claim 21, wherein said optical sensor comprises a camera.

23. (Previously Presented) A method according to claim 22, wherein said camera comprises a CCD element.

24. (Cancelled)

25. (Currently Amended) A method of staining tissue samples in an automatic staining apparatus comprising the steps of:

providing at least one removable sample on at least one slide positioned within a slide section;

providing at least one reagent container positioned on a reagent rack within a reagent section;

wherein a robotic element is configured to move above the reagent section and above the slide section during a staining process and wherein the reagent rack is removable below the plane of the robotic element;

wherein the at least one reagent container is be added to or removed from the apparatus without interrupting dispensing of at least one reagent during the staining process;

providing the robotic element with an optical sensor configured to automatically identify new slides and reagent bottles loaded into the apparatus during the staining process;

recording relevant image data;

feeding said image data to a control element to which said robotic element is responsive, the control element configured to monitor insertion or removal of the at least one reagent container during the staining process and to continue movement of the robotic element and dispensing of at least one reagent during insertion or removal of the at least one removable reagent container; and

biologically analysing image data of said at least one sample with a computer.

26. (Cancelled)

27. (Previously Presented) A method according to claim 25, wherein said optical sensor comprises a camera.

28. (Previously Presented) A method according to claim 25, wherein said optical sensor comprises a CCD element.

29. (Previously Presented) A method according to claim 25, further comprising a step of storing an image relevant to the staining process.

30. (Currently Amended) An automatic staining apparatus comprising:
at least one reagent container positioned on a reagent rack within a reagent section;
at least one sample, the sample being placed on a slide positioned within a slide section;

wherein a robotic element is configured to move above the reagent section and above the slide section during a staining process and wherein the reagent rack is removable below the plane of the robotic element;

wherein the reagent section is situated to enable the at least one reagent container to be added to or removed from the apparatus without interrupting the movement of the robotic element during dispensing of at least one reagent during the staining process;

wherein the robotic element comprises a multifunction optical sensor configured to automatically identify new slides and reagent bottles loaded into the apparatus during the staining process;

a computer image biological analysis element; and

a control element to which the robotic element is responsive, the control element configured to monitor insertion or removal of the at least one reagent container during the staining process and to continue movement of the robotic element and dispensing of at least one reagent during insertion or removal of the at least one removable reagent container.

31. (Cancelled)

32. (Original) An apparatus according to claim 30, wherein said optical sensor comprises a camera.

33. (Original) An apparatus according to claim 30, wherein said optical sensor comprises a CCD element.

34. (Previously Presented) An apparatus according to claim 30, further comprising a stored image relevant to the staining process.

35. (Currently Amended) An automatic staining apparatus comprising:

- at least one removable reagent container positioned on a reagent rack within a reagent section;
- at least two staining sections separated by the reagent section;
- at least one sample placed on a slide in a slide rack, the slide rack being positioned within the staining sections;

wherein a robotic element is configured to move above the reagent section and above the staining sections during a staining process and wherein the reagent rack is removable below the plane of the robotic element;

wherein the reagent section is situated to enable the at least one reagent container to be added to or removed from the apparatus without interrupting the movement of the robotic element during dispensing of at least one reagent during the staining process;

wherein the robotic element comprises an optical sensor configured to automatically identify new slides and reagent bottles loaded into the apparatus during the staining process; and

a control element to which the robotic element is responsive, the control element configured to monitor insertion or removal of the at least one removable reagent container during the staining process and to continue movement of the robotic element and dispensing of at least one reagent during insertion or removal of the at least one removable reagent container.

36. (Currently Amended) A method of staining tissue samples in an automatic staining apparatus comprising the steps of:

providing at least one slide positioned within a slide section;

providing at least one removable reagent container positioned on a reagent rack within a reagent section;

wherein a robotic element is configured to move above the reagent section and above the slide section during a staining process and wherein the reagent rack is removable below the plane of the robotic element;

wherein the at least one reagent container is be added to or removed from the apparatus without interrupting dispensing of at least one reagent during the staining process;

providing the robotic element with an optical sensor configured to automatically identify new slides and reagent bottles loaded into the apparatus during the staining process;

recording relevant image data; and

feeding said image data to a control element to which said robotic element is responsive, the control element configured to monitor insertion or removal of the at least

one removable reagent container during the staining process and to continue movement of the robotic element and dispensing of at least one reagent during insertion or removal of the at least one removable reagent container.